

ABSTRACT OF THE DISCLOSURE

The invention encompasses a method of down-regulating a T cell-mediated immune response, through activation or T cell receptor (TCR) stimulation of antigen-primed T cells in the presence of alpha-melanocyte stimulating hormone ( $\alpha$ -MSH), which may be optionally enhanced by adding transforming growth factor- $\beta$ 2 (TGF- $\beta$ 2) approximately 4-6 hours after the start of the primed T cells' exposure to  $\alpha$ -MSH. Activation of the primed T cells may be mediated by presentation of the specific antigen to the primed T cells, or by an anti-TCR antibody or a T cell mitogen. As a result of the  $\alpha$ -MSH treatment modulating the T cell activation, antigen-specific, regulatory, CD4+/CD25+ T cells are generated that produce transforming growth factor- $\beta$  (TGF- $\beta$ ) and can non-specifically down-regulate Th1-mediated inflammatory activities. The method may be used to down-regulate or suppress an autoimmune condition or a graft rejection in a transplant patient. The invention also encompasses a kit for generating regulatory T cell comprising a specific antigen,  $\alpha$ -MSH, and optionally, TGF- $\beta$ 2 and/or a T cell culture medium. Also provided are gene therapy treatments for suppressing an autoimmune or graft rejection response, or for re-establishing autotolerance, by introducing genetic material (e.g. nucleic acid) for expressing  $\alpha$ -MSH or a receptor-binding portion thereof, into a localized tissue site.